A NEW LOCALITY FOR THE HASTINGS RIVER MOUSE, *PSEUDOMYS ORALIS*, IN SOUTHEAST QUEENSLAND

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A Hastings River Mouse, *Pseudomys oralis*, was captured near O'Reilly's Rainforest Guesthouse on the western edge of Lamington National Park in December 1994. This is only the second locality at which the species has been trapped in Queensland in 25 years. The capture site, in the McPherson Range, is almost 70km east of the *P. oralis* population recently discovered in Gambubal State Forest. The steep topography and comparatively dry vegetation at this new location differ considerably from those reported for previous Hastings River Mouse capture sites. These findings suggest that a wider variety of potential localities and environments should be targeted during future surveys of this species. □ *Pseudomys oralis*, *new locality.*

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The Hastings River Mouse, *Pseudomys oralis* (Rodentia: Muridae), is patchily distributed in mideastern Australia at altitudes between 400m and 1250m (Read, 1993a,b, pers. comm.; Tweedie & York, 1993). Until this study, thirty capture localities were known for the species - five in southeast Queensland and the remainder in northeast New South Wales (Hastings River Mouse Recovery Team, 1993; Fox et al., 1994). The first records of the Hastings River Mouse in Queensland were from the period 1969-1970, when animals were trapped at four separate localities southeast of Warwick (Kirkpatrick & Martin, 1971). Despite additional surveys (Read, 1988), the species was not seen again in this State for over 20 years. In 1993, it was 'rediscovered' near the original capture locations, but at higher altitude, in Gambubal State Forest (Poole, 1994).

Fossil evidence indicates that the present rarity of *P. oralis* is only the result of a relatively recent reduction in the species' distribution and abundance. Skeletal remains of the Hastings River Mouse were common from Holocene cave deposits associated with owl roosts along the Great Dividing Range in New South Wales and Victoria (Wakefield, 1972; Hall, 1974; Kirkpatrick, 1983). Furthermore, the co-occurrence of *P. oralis* and *Rattus rattus* remains at certain localities (Hall, 1974; Lee, 1995) suggests that even at the time of European settlement the distribution of the species was much greater than at present.

In light of this rapid contraction in range of the Hastings River Mouse and the paucity of information on the species' distribution and ecology (Read, 1993b), conservation efforts have focused on locating remaining populations and identifying environmental features that may be used as indicators to predict additional localities for this rare rodent (King, 1984; King & Mackowski, 1986; Read, 1988, 1993a,b; Hastings River Mouse Recovery Team, 1993; Tweedie & York, 1993). In addition, dietary studies have recently been undertaken to assist in determining more precise habitat requirements of the Hastings River Mouse (Fox et al., 1994).

The present paper, documenting a newly discovered locality for *P. oralis* in Queensland, broadens existing knowledge of both the species' geographical distribution and the range of habitats in which it occurs. Importantly, this paper suggests that in Queensland, at least, the current 'search image' used by field workers to select potentially suitable Hastings River Mouse habitats may be too narrow.

METHODS

During a general mammal survey conducted in the vicinity of O'Reilly's Rainforest Guesthouse between December 11 and 16, 1994, a precipitous ridge known as Castle Crag near the western edge of Lamington National Park was chosen as one of many locations to sample for small mammals. Trapping effort at this particular site was low, with 24 size A Elliott traps, baited with salami and a mixture of peanut butter and rolled oats,

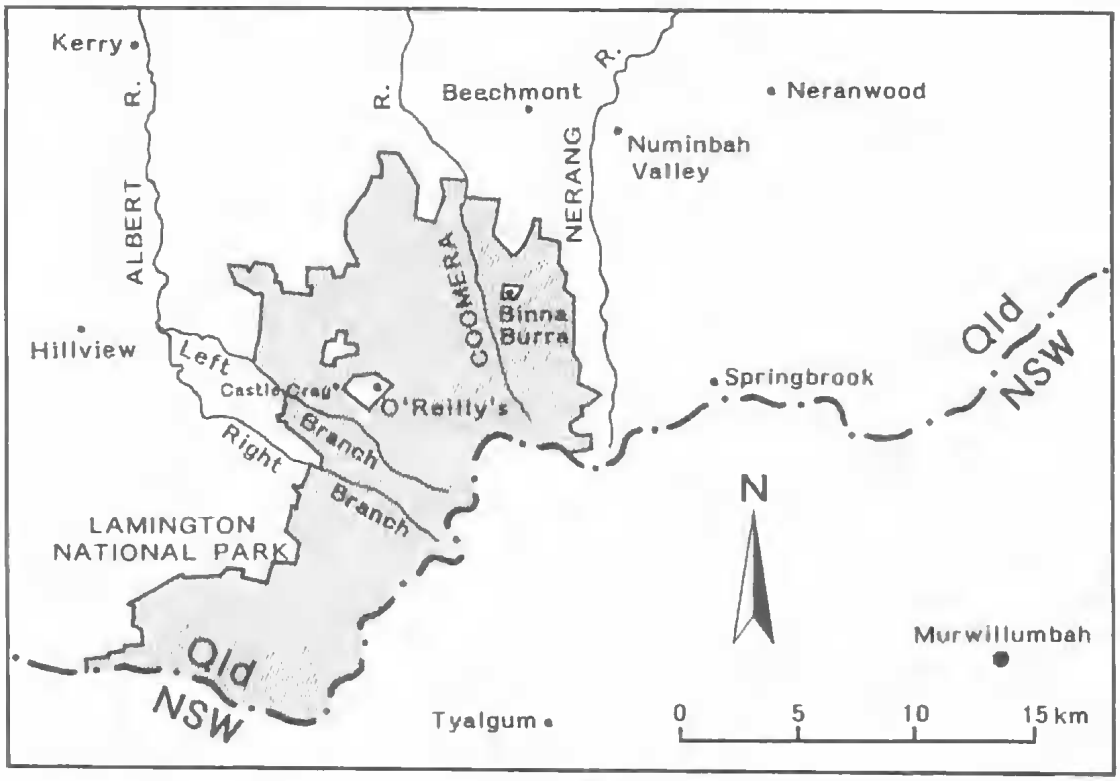

FIG. 1. Location of Castle Crag.

being set along the ridge crest over the two nights of December 15 and 16.

SITE DESCRIPTION

The trapping site (28°14'13"S, 153°07'06"E), located 1.8km WSW of O'Reilly's Rainforest Guesthouse, lies at an altitude of 790m on the west-aligned Castle Crag ridge (Fig. 1). To the north, Morans Creek is some 250m below and to the south, the Left Branch of the Albert River is 400m lower in elevation. A wall of exposed basalt lies along the ridge crest (Fig. 2) and small rock outcrops and cliff faces are features of the southern slope.

Mean annual rainfall at O'Reilly's is 1643mm, however, the trapping period coincided with the end of a severe drought. With precipitation totalling only 1013mm, 1994 was the fourth driest year since 1917 when records at the Guesthouse began.

The vegetation at the trapping site consists of an open dry sclerophyll forest, with a canopy height of 8-10m, growing on a shallow, brown kraznozem (Fig. 3). The forest is dominated by *Eucalyptus banksii* and *Allocasuarina torulosa*, with an occasional *Lophostemon confertus* and a sparse shrub layer of *Xanthorrhoea glauca*. The steepness of the terrain (variable, but averaging c. 70°) and several fires within the last 14 years ensure a minimum of accumulated deadfall. The ground cover is primarily dense *Danthonia longifolia* growing to a maximum height of about 40cm, although close to the ridge crest the cover provided by this grass is more sparse. Other species in the immediate vicinity of the trapping site were *Dendrobium kingianum*, forming a large clump approximately 25cm high, *Daucus glochidiatus*, *Plectranthus graveolens*, *Wahlenbergia graniticola*, *Eupatorium adenophorum*, *E. riparium*, *Brachyscome ascendens*, *Helichrysum bracteatum*, *Rhodanthe anthemoides*, *Podolepis neglecta*, *Lepidosperma laterale*, *Dianella caerulea* var. *assera*, *Bulbine vagans*, *Cymbopogon refractus* and *Doodia aspera*. *Lomandra longifolia* was poorly represented in the understorey near the ridge top, but grew in scattered clumps some 30m downhill of the trap line. The growth of mosses and small ferns lower on the slope indicated that soil mois-

FIG. 2. *P. oralis* capture site (arrowed) near basalt wall along the Castle Crag ridge crest.

ture is greater there than near the ridge crest. The vegetation of the much warmer northern side of the ridge was relatively sparse and included *Eucalyptus tereticornis*, *E. melliodora* and occasional *Acacia melanoxylon*.

Approximately 450m to the east, the ridge line broadens and the dry sclerophyll forest grades into very tall (35m) wet sclerophyll forest with a dense fern understorey. This gives way to notophyll vine forest after a further 130m. The nearest permanent water to the trapping site is the section of Morans Creek above Morans Falls, approximately 900m to the northeast. A small seepage area 800m to the northeast would only provide moisture after periods of rain.

RESULTS AND DISCUSSION

An adult Hastings River Mouse (Fig. 4) was captured on Castle Crag on the night of December 15, 1994. The successful trap was positioned on a small grassy ledge at the top of the southerly aspect, close to the exposed basalt wall (Fig. 2). No other mammals were caught in the trap line, although a total of five Major Skinks, *Egernia frerei*, was also captured over the two nights. The *P. oralis* individual, a lactating female, was removed from the site and weighed, measured and photographed, before being released shortly afterwards at the point of capture. Its head and body (to vent) length was 135mm, tail to vent length 141mm, hind foot length 30mm and weight 85g. The identification was subsequently confirmed from the photographs by S. Van Dyck of the Queensland Museum.

Castle Crag is only the second locality at which *P. oralis* has been trapped in Queensland since the initial records of Kirkpatrick & Martin (1971) near Warwick in 1969-70. Lying approximately 68km east of the site where a population was recently discovered in Gambubal State Forest (Poole, 1994), it is well away from the general vicinity of previous captures. Indeed, the present locality on the northern fall of the McPherson Range (Fig. 5) is unique because all other specimens of the Hastings River Mouse in eastern Australia have been caught in close proximity to the Great Divide (Read, 1993a; Fox et al., 1994). Earlier, 'outlying' records of *P. oralis* do exist - identifiable bones were collected in 1976 from 'relatively fresh' owl pellets near Mapleton in the Blackall Range of southeast Queensland (Kirkpatrick, 1983; Read, 1988) and also in 1986 from a Grass Owl, *Tyto capensis*, pellet near Wardell in coastal New South Wales (G. Holmes, pers. comm.; Lee, 1995) - but the species has not yet been recorded alive at these localities.

The present record is of particular interest because of the nature of the topography and vegetation on Castle Crag. The altitude and rainfall at the site lie within the ranges recorded for previous Hastings River Mouse capture localities (King, 1984; King & Mackowski, 1986) and the general habitat is an open dry sclerophyll forest with a grassy understorey, as is typical for the species (e.g. King & Mackowski, 1986; Read, 1993b; Tweedie & York, 1993; Fox et al., 1994). An obvious difference, though, is that the forest canopy is much lower (8-10m) than the 20-40m upperstorey heights reported for other *P. oralis* sites (King, 1984; King & Mackowski, 1986; Townley, in press), due to the location on a narrow, exposed ridge on shallow soils. However, Read (1993b) concludes that the type or abundance of tree cover are probably not important factors in determining suitable habitat for the Hastings River Mouse, and so details of the forest structure on Castle Crag may not be especially critical. A more significant difference is that most

FIG. 3. Southern slope of Castle Crag from *P. oralis* capture site.

other capture sites possess stands of sedges (Cyperaceae and Juncaceae, particularly *Carex*, *Cyperus* and *Juncus*) growing in association with either permanent water in creeks and gullies or with bogs, soaks or seepage areas on ridges and mid-slopes (Read, 1988, 1993a,b; Hastings River Mouse Recovery Team, 1993; Tweedie & York, 1993; Lee, 1995). Such moist conditions do not exist on Castle Crag. Permanent water is not accessible and the lack of terracing on the steep slope has prevented the formation of boggy areas which would enable the growth of stands of these sedges (cf. Read, 1993a,b). Also, there are no seepage areas nearby and ground moisture is apparently insufficient to support species of *Carex*, *Cyperus* or *Juncus*. The only sedge present, *Lepidosperma laterale*, is represented by individual plants sparsely distributed through the understorey.

Of the ground cover species recorded at Castle Crag, only *Lomandra longifolia*, *Lepidosperma laterale* and *Doodia aspera* have been reported in the understorey at other captures sites (King, 1984; King & Mackowski, 1986; Hastings River Mouse Recovery Team, 1993; Read, 1993b; Fox et al., 1994), suggesting a difference in habitat type at this new locality. The sedge *L. laterale* has never been recorded in the diet of *P. oralis*, but seed head material from *Lomandra longifolia* and pollen from an unidentified species of mat-rush are known to be eaten by the Hastings River Mouse (Fox et al., 1994; A. Smith & D. Quin, unpublished data), although Read (1993b) does not consider *L. longifolia* to be an indicator of suitable *P. oralis* habitat where it occurs on hill sides. On separate occasions, S. Townley (pers. comm.) has observed radio-tracked animals in Billilimbra State Forest in New South Wales eating *Doodia aspera* and an undetermined species of *Plectranthus*. Leaf and seed head material tentatively identified as originating from a *Plectranthus* sp. was also found during a dietary analysis of the Hastings River Mouse in the same State Forest (A. Smith & D. Quin, unpublished data). *Plectranthus graveolens* is present at Castle Crag and may, together with *Doodia*, represent a food resource for the Hastings River Mouse there. Clearly, an analysis of faecal pellets from animals at the Lamington National Park site would provide valuable information about what plant species and items are eaten and would assist in refining current knowledge of habitat features that are critical for *P. oralis* at this and other locations.

The Hastings River Mouse capture site in Gambubal State Forest shares some similarities with the present one in that it is also distant from surface water and is adjacent to a rocky escarpment (Hastings River Mouse Recovery Team, 1993; Poole, 1994). S. Townley (pers. comm.) has found that individual animals in Gambubal State Forest use cracks and crevices in rocks of

FIG. 4. Adult female *P. oralis* captured at Castle Crag.

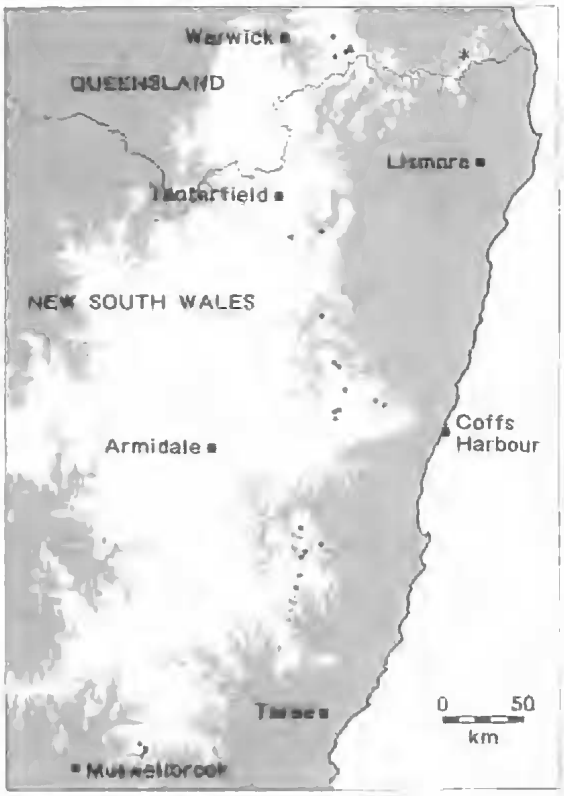

FIG. 5. The location of Castle Crag (asterisk) in relation to previous *P. oralis* capture sites in eastern Australia (dots). The area shaded grey is land below 500m elevation. Four sites in New South Wales discovered since 1993 (Fox et al., 1994) are not shown. (Adapted from Read, 1993a).

the cliff face for shelter. The same may be true on Castle Crag, where potentially suitable nesting locations in areas of exposed rock were numerous. There are, however, fundamental differences between these two Queensland sites. Substantially more habitat area is available for the species at Gambubal State Forest, most occurring on flat or gently sloping terrain, and conditions there are more lush, with the grassy, tall open forest abutting notophyll vine forest across an abrupt ecotone. The open forest of this ecotonal area has recently been found to support significant quantities of the sedge *Carex breviculmis* (Y. Ross, pers. comm.). By contrast, as previously stated, no *Carex* spp. occur at the capture site in Lamington National Park and the nearest notophyll vine forest is almost 600m away.

Given that the female Hastings River Mouse reported here was in a reproductive state and, therefore, unlikely to be a transient individual at the site, this record indicates that Castle Crag supports a viable, even if isolated, population of *P. oralis*. Furthermore, it extends the diversity of habitat types the species is known to utilise and suggests a broader range of localities and environments should be targeted during future surveys for the Hastings River Mouse, particularly in Queensland. Additional work to determine the population size and distribution of *P. oralis* in the Lamington National Park area is currently being undertaken to clarify the status of the species in this State.

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